

Parker Bridge  
Spanning the Verdigris River  
Southeast of Coffeyville  
Montgomery County  
Kansas

HAER No. KS-7

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KANS,  
63-COF.V,  
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Rocky Mountain Regional Office  
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P.O. Box 25287  
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HISTORIC AMERICAN ENGINEERING RECORD  
PARKER BRIDGE

I. INTRODUCTION

Location: Spanning the Verdigris River 1.5 miles southeast of Coffeyville, Kansas, on an unnamed off system road.

Quad: Coffeyville East

UTM: 15/269350/4098410

Date of Construction: 1871 [Bowstring]  
ca. 1920 [camelback]

Present Owners: Montgomery County  
Montgomery County Courthouse  
Independence, Kansas

Present Use: None--Abandoned  
Projected date of removal,  
Summer-Fall 1988

Significance: The combination bowstring/camelback bridge is a riveted steel high through truss and is one of only five camelbacks known to exist in the state.  
The bowstring pony truss is the only identified example of a Wrought Iron Bridge Company pony truss to exist in this State.

Historian: Larry Jochims, Director of  
Historical Research, Kansas State  
Historical Society

## HISTORICAL OVERVIEW

The town of Parker was established in the fall of 1869. Although the town grew slowly in the beginning, there was hope that the railroad would decide to use the site as a terminal point. By the time it was incorporated as a city in 1871, there were more than 1,000 residents and about 50 flourishing business establishments. Unfortunately, for Parker, the railroad chose a different site on the opposite side of the river. This was to become the present day Coffeyville. The removal of businesses from the town and resultant panic insured the settlement's demise.

The first officially recognized crossing near Parker was in the form of a ferry operated by John Bowosh and William McDonald. The county commission granted them a year's license from January 1, 1871 for a fee of \$7,500. Crossing charges were regulated at 15 cents for horsemen, 50 cents for teams with wagon, 10 cents for additional horse, mule or yoke of oxen, and 75 cents for a two way trip for local teams of horses, mules or yoke of oxen.

On May 17, 1871, bids were opened for the construction of four bridges in the county located at Independence, Liberty, Parker, and Elk City. The main span at Parker was to be 150 feet in length. Bonds would be issued to pay for the construction and the project at its inception was quite controversial. Many stream crossings were needed in the county and as Montgomery was newly organized it barely had enough income to handle routine expenses. There was the

feeling that the \$35,000 authorized by the legislature should be used for several inexpensive wooden structures rather than a few "iron" ones. The iron bridge's proponents prevailed.

Four bids were received: The Miller Bridge Company at \$29,235, the King Bridge Company at \$29,585, the Wrought Iron Bridge Company at \$29,853 and the Ohio Bridge Company at \$31,250. The contract was awarded to E. I. Farnsworth, agent of the Wrought Iron Bridge Company, because Miller would not accept the county bonds and the masonry specifications by King were inferior.

Farnsworth was to be paid at the rate of \$34 per lineal foot for superstructure, \$9.50 per cubic yard for masonry, and 85 cents per cubic yard for excavation in monthly installments. The township in which each bridge was to be built was charged with the responsibility of constructing the approaches.

Edwin I. Farnsworth had been appointed city engineer for the city of Leavenworth in 1867. He held this position until 1871, when he became an agent for the Wrought Iron Bridge Company. In 1872 he became the chief engineer for the competing King Iron Bridge Company in Topeka. Although successful, Farnsworth came to realize that he could manufacture and sell bridges easier in Kansas than have them imported from eastern firms. Returning to Leavenworth, he organized the Missouri Valley Bridge and Iron Works. He would later be involved in the development of Kansas City Bridge and Iron, Chicago Bridge and Iron, and Farnsworth and Blodgett.

The Parker bridge was finished by December 8, 1871. In recording the event, Ross's Paper stated, "This very much facilitates the intercourse between the two towns and is a valuable improvement to the county."<sup>1</sup>

The exact construction date of the camelback truss is presently unknown but probably occurred between 1920-30.

By the 1920s the nationwide system of roads was in its infancy but growing. The Federal Highway Act of 1921 had imposed national standards on highway design and construction. This gave further impetus to the trend towards standardization of bridge design begun around 1900. With the mass production of standard shapes, posts, channels, angles, rods, T's, and beams, companies found it much simpler to stock these "standard shapes" than order specially made members. When it received a bridge order, a company computed the stresses, determined the dimensions of the various shapes needed and then cut the stock to length. The chords and posts were fabricated from channels, plates, angles, and straps.

The greater strength of the newer steel sections allowed the use of fewer though more massive members than the older wrought iron did. Steel bridges, such as the Parker truss,

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1. "New Bridge, Coffeyville Ross's Paper, December 8, 1871.

make a definite first impression on the viewer. As David Weitzman reports in his Traces of the Past, the steel bridge appears "more massive, ponderous, more earthbound," than its wrought iron relative.<sup>2</sup>

The riveted members of the Parker bridge are indicative of a change in construction techniques during the first two decades of the 20th century.

American engineers of the 19th century preferred pin connected designs. There were several reasons for this. Pin connected bridges were faster to assemble than the early riveted ones. This resulted in a cost savings as well as a positive safety factor. Workers were subjected to the hazards of their job for a shorter amount of time. The quality of the early riveted structures was sometimes questioned since it was not possible to be certain of a rivet's integrity once it had been installed. Each was subjected to a great deal of stress and sometimes was quite brittle after cooling. The stresses in a riveted joint were much more difficult to determine than in a pinned joint. Engineers saw the pin as one large rivet and knew its shear strength and qualities. It was basically more predictable. On the other hand pinned connections were less rigid than riveted connections and required more web members (counters, vibration rods and struts) for stability under various loading conditions.

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2. David Weitzman, Traces of the Past: A Field Guide to Industrial Archeology, New York: Charles Scribner's Sons, 1980, p. 75.

The invention of the pneumatic hammer in 1892 and the subsequent development of the pneumatic riveter changed engineers' attitudes. Riveting could now be done in the field and the connection which resulted was stronger and more reliable. By the time the Parker bridge was built, riveted construction had gained the ascendancy.

The use of wrought iron in bridge fabrication was extremely popular in 1871. Although steel was available it was not widely used. The first steel truss bridge in America would not be built until 1878 and was not accepted as standard construction practice until the 1890s.

In 1871, Wrought Iron Bridge Company was using proprietary wrought iron bridge sections as manufactured by the Phoenix Iron Company in its bowstring arches. This Philadelphia, Pennsylvania company became famous for manufacturing everything from the initial iron and steel to erecting finished bridges.

The particular patent for the tubular columns used in the Parker bridge was granted to S. J. Reeves of Philadelphia on June 17, 1862. The Reeves family controlled Phoenix Iron Company.

According to the patent, Reeves claimed that he had found a new way of uniting together three or more pieces of wrought iron, "made with flanges in the direction of their length, so that they shall form a column or shaft to be used as posts and also as braces or compression chords in the construction of buildings, bridges, piers or other structures."

Photographic evidence indicates that the bowstring and a Pratt predate the camelback and that the camelback replaced a bowstring of similar span. This contention is further supported by the fact that the remaining bowstring is of the wrought iron tubular type of construction used by the Wrought Iron Bridge Company of Canton, Ohio, which had the original contract.

#### CAMELBACK TRUSS

The bridge over the Verdigris River at Parker, the subject of this report, presently consists of two spans. The first is a high steel camelback through truss and the second is a tubular wrought iron bowstring pony truss. A third span consisting of a Pratt pony truss was removed December 19, 1980. The total length of the three spans was 284 feet. The roadway was sixteen feet wide. The deck was situated approximately 30 feet above water level. The Pratt pony truss was supported on its west end by steel bents and on the east by a limestone pier. This also served as the bearing point for the west end of the bowstring truss. The bowstring is supported on its east end by a reinforced concrete pier. This pier provides the west support of the camelback truss. It is supported on the east approach by a limestone abutment.

The members of a truss bridge are designated either as chord members or web members. Chord members define the outline of the structure and are termed lower or upper chord members, depending on whether they are found at the bottom or top of the structure. Upper chord members usually are heavier

because they work in compression. Lower chord members are lighter because they resist tensile forces. Members between the chords are web members. They are called posts and resist compressive or tensile forces respectively. In the case with the Parker camelback, the web members are alternately vertical and inclined. The inclined members are in tension and the verticals in compression.

The inclined endposts and polygonal top chord of the truss are built up sections consisting of two steel channels, a top plate, and tied together with horizontal flat bars. The hip verticals, posts and main diagonals are all fabricated from angle sections with horizontal flat lacing bars. The portal bracing is fabricated from angle sections and flat bars. All connections are riveted.

The main camelback span is one of only five known to exist in the state at this time.

#### BOWSTRING TRUSS

The bowstring arch truss is a tubular wrought iron design, patented in 1873, by David Hammond, who was one of the most prolific designers of metal truss bridges during the 19th century and a principal of the Wrought Iron Bridge Company. The main feature of his patent was a tubular arch, made up of riveted wrought iron plates that improved the strength of the arch without adding to the weight.

The bowstring arch bridge is a tied arch with diagonal webs serving as bracing. The diagonal rods are threaded at both

ends and pass through the upper and lower chord and are attached to the ends by nuts. The verticals consist of threaded wrought iron star bars which are attached to the upper and bottom chord in a similar manner with nuts. Deck beams, supporting the road, sat on top of the bottom chord members at the panel points.

Hammond's bowstring arch is an excellent example of the multitude of patented variations of metal truss designs that were available during the late 19th century. Though once a common sight at Kansas river crossings, the bowstring is now quite rare.

#### CONCLUSION

Although there have been modifications at the site the integrity of setting, location, feeling and association still remain intact. The erection of the bridge provided a vital link not only for the commercial benefit of Parker but also for the benefit of travelers headed for the then Indian Territory. It represents the optimism of the surrounding settlers and stood for the prosperity they saw in the future for their community.

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